National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

MAY 2[illegible] 1979

JSC-14635

[illegible]-10228
NASA CR-
160246

EARTH OBSERVATIONS DIVISION

SPACE AND LIFE SCIENCES DIRECTORATE

(E79-10228) ACCEPTANCE TEST SPECIFICATIONS OF THE LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES) (Lockheed Electronics Co.) 46 p HC A03/MF A01 CSCL 05B G3/43
N79-28642
Unclas
00228

ACCEPTANCE TEST SPECIFICATIONS
OF THE
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES)

Job Order 71-485

Prepared By
Lockheed Electronics Company, Inc.
Systems and Services Division
Houston, Texas

Contract NAS 9-15800

ORIGINAL PAGE IS OF POOR QUALITY

March 1979

LEC-12900

ACCEPTANCE TEST SPECIFICATIONS
OF THE
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES)

Job Order 71-485

Prepared By

J. M. Everett

J. M. Everette
Data Systems Department

Approved By

LEC

G. W. Buchman, Project Manager
HDT Implementation

NASA

J. C. Lyon, Task Monitor
Systems and Facilities

Prepared By
Lockheed Electronics Company, Inc.
For
Earth Observations Division
Space and Life Sciences Directorate
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

March 1979

JSC-14635

JAN 22 1980

CHANGE SHEET
FOR THE
ACCEPTANCE TEST SPECIFICATION
FOR
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES)

Change 3

January 4, 1980

Approved By

LEC

JI Morrow

J. I. Morrow, Supervisor
Software Section

NASA

JM Sulester

J. M. Sulester, Technical
Monitor System and Facilities

After the attached replacement pages have been inserted, insert this change sheet between the cover and page 1 and write on the cover "Change 3 inserted".

1. Remove page iii.
2. Insert replacement page iii.
3. Insert additional page 9-1.
4. Insert Appendix 9.1 in its entirety.

Emily B. Brown

Signature of person Incorporating change

Date

JSC-14635

CHANGE SHEET
FOR THE
ACCEPTANCE TEST SPECIFICATION
FOR
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES)

CHANGE 4

January 15, 1980

Approved By

LEMSCO

J. I. Morrow, Supervisor
Software Section

NASA

J. M. Sulester, Technical Monitor
Systems and Facilities Branch

After the attached pages have been inserted, insert this change sheet between the cover and page 1 and write on the cover "Change 4 inserted".

1. Insert Appendix 9.2 in its entirety.

Emily B. Brown
Signature of person incorporating change

11-25-80
Date

CONTENTS

ACCEPTANCE TEST SPECIFICATIONS FOR THE LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES)

1. SCOPE.............................. 1-1

2. APPLICABLE DOCUMENTS............... 2-1

3. QUALITY ASSURANCE.................. 3-1

4. OVERVIEW OF TEST................... 4-1

4.1 FUNCTIONAL TEST.................... 4-1

4.2 WORKING ENVIRONMENT TEST........... 4-1

4.3 RECOVERY TEST...................... 4-6

5. TEST DATA AND MATERIALS............ 5-1

5.1 FUNCTIONAL TEST.................... 5-2

5.2 WORKING ENVIRONMENT TEST........... 5-6

5.3 RECOVERY TEST...................... 5-6

6. FUNCTIONAL TEST.................... 6-1

6.1 PRE-TEST OPERATIONS................ 6-1

6.2 TEST OPERATIONS.................... 6-2

6.3 POST-TEST OPERATIONS............... 6-7

6.4 TEST VERIFICATION.................. 6-7

7. WORKING ENVIRONMENT TEST........... 7-1

7.1 PRE-TEST OPERATIONS................ 7-1

7.2 TEST OPERATIONS.................... 7-2

7.3 POST-TEST OPERATIONS............... 7-6

8. RECOVERY TEST...................... 8-1

8.1 PRE-TEST PREPARATION............... 8-1

8.2 TEST OPERATIONS.................... 8-1

8.3 POST-TEST ACTIONS.................. 8-2

8.4 TEST VERIFICATION.................. 8-2

9.0 APPENDICES......................... 9-1

Figures

Figures	Page
4-1 LIVES Functional Test	4-2
4-2 Working Environment Test	4-3

Tables

Page

4-1 Modules to be Tested Explicitly in the Functional Test 4-4

4-2 Working Environment Test 4-5

5-1 Artificial Full Scenes for the Functional Test 5-2

5-2 Areas of Interest for the Functional Test 5-3

5-3 Reference Images for the Functional Test 5-4

5-4 Special Test Programs for the Functional Test 5-5

5-5 Full Scenes for the Working Environment and Recovery Tests 5-7

5-6 Areas of Interest for the Working Environment and Recovery Tests 5-8

5-7 Reference Images for the Working Environment and Recovery Tests 5-9

5-8 Special Test Programs for the Working Environment Test 5-10

1. SCOPE

1.1 SCOPE OF THIS DOCUMENT

The Test Plan for the Landsat Imagery Verification and Extraction System (LIVES) presented an early overall concept of the acceptance test. The present document presents the definitive details of the test, including the actual details of each procedure.

In general terms, this document follows the guidelines presented in reference 2.1-1 as interpreted by reference 2.1-2, when feasible. Sufficient additional details are presented to meet minimum requirements put forth in reference 2.1-3, the basic federal document on documentation of computer systems (FIPS-38).

1.2 BACKGROUND OF LIVES

Throughout the Large Area Crop Inventory Experiment (LACIE), the NASA facilities at Goddard Space Flight Center (GSFC) preprocessed all imagery data. That facility had taken imagery data for scenes of interest to LACIE, extracted segments of interest, registered the segments to constant reference images, and forwarded the final segment data to LACIE.

The Goddard facilities will change their method of operation. Landsat images will be preprocessed and, in many cases, registered as full scenes. The imagery data will be forwarded to user agencies as full scenes on high density tapes (HDT's). User agencies will be expected to extract the data as needed; the Goddard facilities will no longer extract subsets of the full-scene imagery.

1.3 ENVIRONMENT AND USE OF LIVES

In general terms, local users will furnish information on Landsat scenes needed by the Earth Observations Division at NASA's Johnson Space Center.

This information will be used to order scenes from the Image Preparation Facility of Goddard Space Flight Center. That facility will furnish the needed scenes on high density tapes (HDT's). At the same time, it will furnish an inventory tape (GHIT) with information on all scenes and tapes furnished during that day.

The high density tapes will be forwarded to the High Density Tape Reformatting System (HDTRS) currently under construction by the Ford Aerospace and Communications Corporation. Here the scenes from these tapes will be automatically transferred to the Full Scene Data Base on non-portable 300-megabyte disks.

These scenes are available for processing by LIVES at this point. The entire set of LIVES programs is applied to these scenes, to the inventory tape, and to user-furnished information, which collectively form the input to this system.

The output of the system is Computer Compatible Tapes (CCT's) which contain user-specified areas of interest and related ancillary data.

2. APPLICABLE DOCUMENTS

This section presents a list of all major-references for this project. They are presented under the following headings.

2.1 SPECIFICATIONS FOR DOCUMENTS

2.2 PROGRAMMED DOCUMENTATION OF LIVES

2.3 DOCUMENTATION OF THE HIGH DENSITY TAPE REFORMATTING SYSTEM (HDTRS)

2.4 DOCUMENTATION OF EXTERNAL SYSTEMS

2.5 INFORMATION ON MAJOR SOFTWARE COMPONENTS

2.6 INFORMATION ON MAJOR HARDWARE ITEMS

In some cases, particularly in Section 2.2, reference will be made to documents yet to be prepared.

2.1 SPECIFICATIONS FOR DOCUMENTS

2.1-1 Building 17 Facilities Configuration Management Plan A, JSC-10105 (September 1977); with change 2 (August 1978).

2.1-2 INTEGRATED STANDARDIZATION, OPERATION, AND QUALITY ASSURANCE PLAN FOR SOFTWARE DEVELOPMENT SECTION, 626-45, LEC-9972 (January 1977).

2.1-3 GUIDELINES FOR DOCUMENTATION OF COMPUTER PROGRAM Guidelines for Documentation of Computer Programs and Automated Data Systems, Federal Information Processing Standards FIPS PUB 38, U.S. Department of Commerce, National Bureau of Standards (February 1976).

2.2 PROGRAMMED DOCUMENTATION OF LIVES

The following documents are specified in reference 2.1-1 and, in some cases, clarified in reference 2.1-2. The complete assemblages is presented here for reference even though some have yet to be prepared.

2.2-1 Job Order 71-485 High Density Tape Implementation.

2.2-2 Functional Requirements Document (FR) (informal document only), August 1978.

2.2-3 Implementation Requirements Specification (IRS), LEC-12862, November 1978.

2.2-4 Preliminary Functional Design Document (FD), (informal document only) August 1978.

2.2-5 Project Development Plan (PDP), JSC-14579, LEC-12856, October 1978.

2.2-6 Preliminary Design Specification (FS: Functional Specifications), JSC-14577, LEC-12838, November 1978.

2.2-7 Test Specification (DTS), JSC-14635, LEC-12900 (this document).

2.2-8 Test Plan (TP), JSC-14578, LEC-12857, October 1978.

2.2-9 Detailed Design Specification (DDS), JSC-14611, LEC-12901.

2.2-10 Facilities Preparation Plan, LEC-13069, January 1979.

2.2-11 Test Preparation Sheet, to be prepared.

2.2-12 User's Manual, JSC-14632, LEC-12902, March 1979.

2.2-13 Operations Manual, JSC-14633, LEC-12903, April 1979.

2.2-14 "As-Built" Design Specification, JSC-14634, LEC-12904, to be prepared.

2.3 DOCUMENTATION OF THE HIGH DENSITY TAPE REFORMATTING SYSTEM, HDTRS

2.3-1 Landsat HDT Reformatting System (HDTRS), Ford Aerospace and Communications Corporation, July 1978.

2.3-2 Landsat HDT Reformatting System, Interface Control Document, Ford Aerospace and Communications Corporation, August 1978.

2.3-3 Ford Aerospace and Communications, Operations Manual for HDTRS.

2.4 DOCUMENTATION ON EXTERNAL SYSTEMS

2.4-1 Goddard HDT Inventory Tape (GHIT) Operations Research, Inc., NAS5-23762, February 1978.

2.5 INFORMATION ON MAJOR SOFTWARE COMPONENTS

2.5-1 RIMS Design Specification, LEC-9564, February 1976.

2.5-2 Detail Design Specification for Enhancement of the Automatic Status and Tracking System Software, JSC-13789, LEC-11512, November 1977.

2.5-3 RIMS Users Guide, LEC-9301, Revision A, April 1977.

2.5-4 Addendum to RIMS Users Guide, LEC-11756, January 1978.

2.5-5 IBM User's Guide, LACIE, section 10.4.1.1 through 10.4.1.6, April 1975 (variously revised).

2.5-6 Software Description volume of the IMAGE 100 User Manual, G.E. Space Division (Daytona Beach, Florida), June 1975.

2.6 INFORMATION ON MAJOR EQUIPMENT

2.6-1 High-Density Digital Tape Recorder, Martin-Marietta Corporation, P75-48236-2, June 1975.

2.6-2 Serial Controller Interface - Input (SCII), Interface Control Document and Test Software Requirements, General Electric Company, February 1978.

2.6-3 Serial Controller Interface - Input (SCII), Product Specification, General Electric Company, February 1978.

3. QUALITY ASSURANCE

3.1 GENERAL

Results of testing shall be noted on margins of this document. The Quality Assurance Test Witness will ensure that all procedures have been executed, that all input and output products are correct or within tolerances, and that all modules function as they should. After completion, the Test Preparation Sheet will be completed and signed by persons responsible for each function listed thereon to show approval within his function.

3.2 ACCEPTANCE CRITERIA

Test requirements were established in a general sense by the Test Plan (reference 2.2-8), which was published before the final design of the LIVES was established. The specifications document (this document) provides procedures for the detailed tests. Acceptance of LIVES shall depend on the successful fulfillment of each individual test as herein described.

Where applicable, a test will be deemed successful if the outputs generated by the test are identical to the expected outputs. Response times and other subjective measurements will be deemed successful or unsuccessful by the conductor. If failures or discrepancies occur, they will be noted. In case of problems, a particular test may be suspended at the discretion of the Test Conductor. After problems are resolved, that specific test will recommence at the location specified by the Test Conductor.

4. OVERVIEW OF TEST

The Acceptance Test will be conducted in three portions. The first, called the Functional Test (Section 6), will be designed to verify that modules perform their functions. The second, called the Working Environment Test (Section 7), will test overall operation in a working environment. The third (Section 8) will test recovery procedures in case of computer failure.

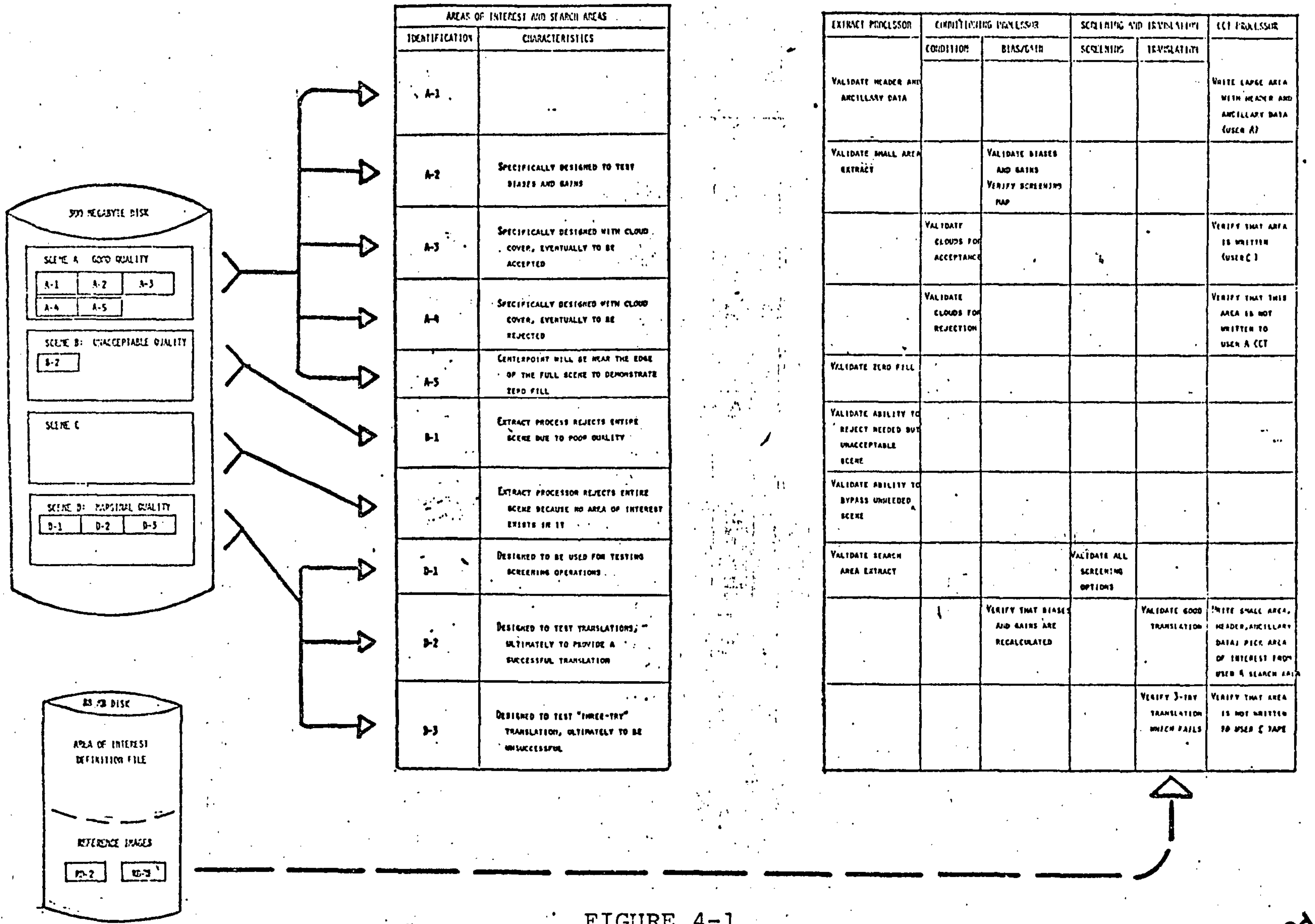
4.1 FUNCTIONAL TEST

There will be one Functional Test to exercise all modules listed in Table 4-1. The strategy of the test is illustrated by Figure 4-1. That test will be run by presenting test data to the computer operator, along with a set of instructions for running the entire test. There will be intervention of an analyst to perform a screening and translation operation. This will exercise all main functions of that processor in an interactive way.

4.2 WORKING ENVIRONMENT TEST

This test is designed to assess the operation of LIVES in its working environment. Tests will be conducted while the HDTRS is functioning concurrently. The various portions of this test are shown in Table 4-2. The strategy of this test is illustrated by Figure 4-2.

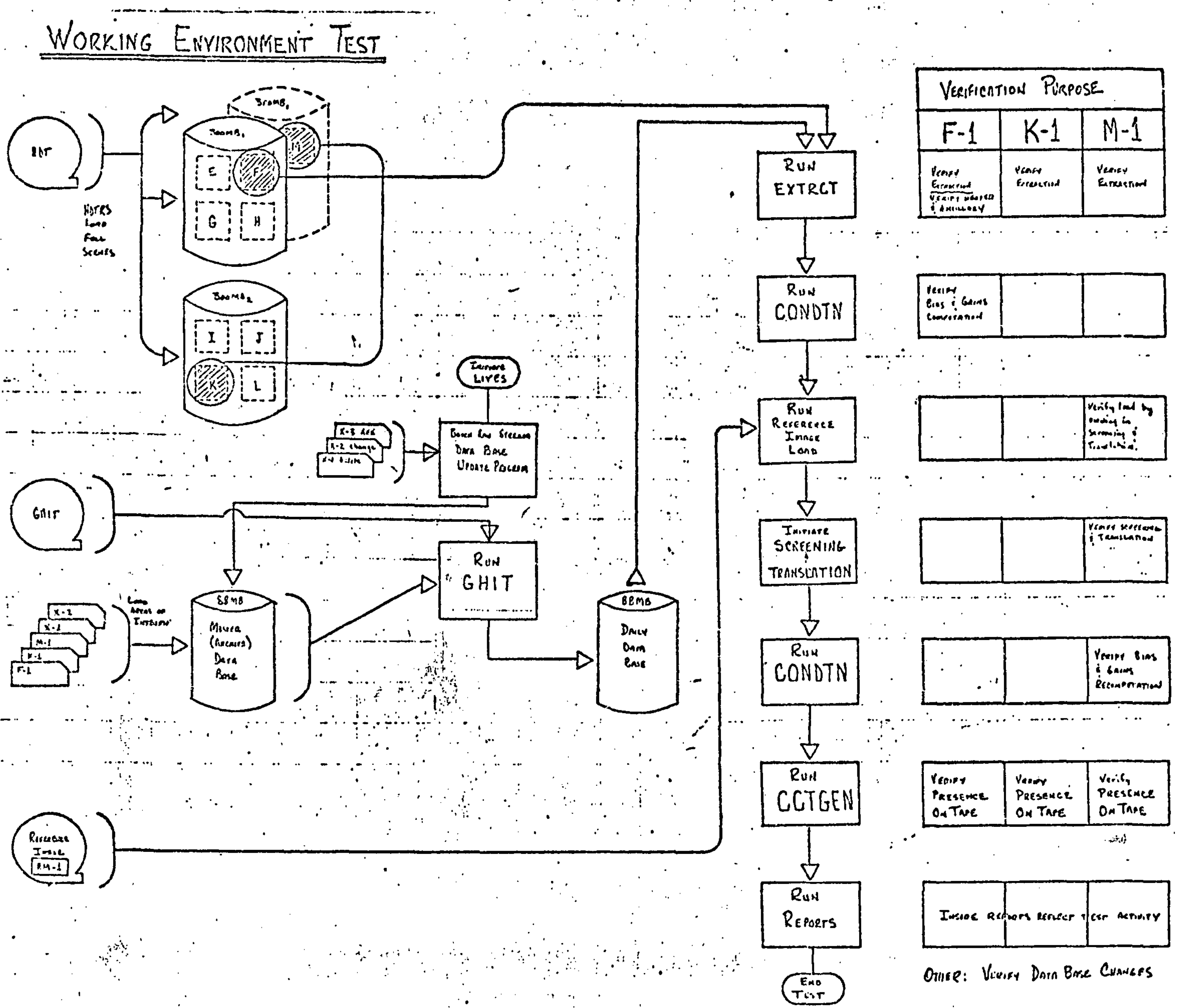
7



AREAS OF INTEREST AND SEARCH AREAS	
IDENTIFICATION	CHARACTERISTICS
A-1	
A-2	Specifically designed to test biases and gains
A-3	Specifically designed with cloud cover, eventually to be accepted
A-4	Specifically designed with cloud cover, eventually to be rejected
A-5	Centerpoint will be near the edge of the full scene to demonstrate zero fill
B-1	Extract process rejects entire scene due to poor quality
[illegible]	Extract processor rejects entire scene because no area of interest exists in it
D-1	Designed to be used for testing screening operations
D-2	Designed to test translations; ultimately to provide a successful translation
D-3	Designed to test "three-try" translation, ultimately to be unsuccessful

EXTRACT PROCESSOR	CONDITIONING PROCESSOR		SCREENING AND TRANSLATION		CCT PROCESSOR
	CONDITION	BIAS/GAIN	SCREENING	TRANSLATION	
Validate header and ancillary data					Write large area with header and ancillary data (user A)
Validate small area extract		Validate biases and gains Verify screening map			
	Validate clouds for acceptance				Verify that area is written (user C)
	Validate clouds for rejection				Verify that this area is not written to user A CCT
Validate zero fill					
Validate ability to reject needed but unacceptable scene					
Validate ability to bypass unneeded scene					
Validate search area extract			Validate all screening options		
		Verify that biases and gains are recalculated		Validate good translation	Write small area, header, ancillary data; pick area of interest from user B search area
				Verify 3-try translation which fails	Verify that area is not written to user C tape

FIGURE 4-1
LIVES Functional Test



VERIFICATION PURPOSE		
F-1	K-1	M-1
Verify Extraction Verify updated & ancillary	Verify Extraction	Verify Extraction
Verify Bias & Gains Computation		
		Verify load by reading in Screening & Translation
		Verify screening & Translation
		Verify Bias & Gains Recomputation
Verify Presence On Tape	Verify Presence On Tape	Verify Presence On Tape
Inside Reports reflect test activity		

Other: Verify Data Base Changes

FIGURE 4-2
Working Environment Test

9

TABLE 4-1. - MODULES TO BE TESTED EXPLICITLY IN THE FUNCTIONAL TEST

Module	Functions To Be Tested
Extraction Processor	Extract areas of interest and search areas from full scene data base.
Conditioning Processor	Examine for cloud cover, compute bias and gains.
Screening and Translation Processor	Screen images for quality; translate images to improve registration.
CCT Generate Processor	Select areas of interest from Search Area Data Base. Write areas of interest on CCT's.

TABLE 4-2.— WORKING ENVIRONMENT TEST

No.	Processor	Functions to be Tested
1.	GHIT	Extraction of information from GHIT
2.	Extraction	Extraction of Imagery & ancillary data from HDT
3.	Conditioning	Calculate gains and biases, classify clouds
4.	Screening and Translation	Translation
5.	CCT Generate	Preparation of CCT
6.	Data Base operations	Add, update, delete files
7.	Reports	Prepare all pre-programmed reports

4.3 RECOVERY TEST

This test will be run from the beginning, using the same steps as the working environment test.

For all processors, an "abort" command will be entered during operations. Recovery procedures will be initiated to verify recovery procedures.

5. TEST DATA AND MATERIALS

5.1 TEST DATA FOR THE FUNCTIONAL TEST

5.1.1 ARTIFICIAL FULL SCENES

Four artificial full scenes will be used in the test. Table 5-1 presents the scenes to be used. The exact contents will be presented at the time of testing.

5.1.2 AREAS OF INTEREST

A variety of areas of interest will be defined to cover all cases to be tested. Table 5-2 presents details on each of these areas.

5.1.3 REFERENCE IMAGES

For testing the Screening and Translation Processor, two reference images will be available, as shown in Table 5-3.

5.1.4 SPECIAL COMPUTER PROGRAMS FOR THE FUNCTIONAL TEST

A variety of special test programs will be used in the test, as shown in Table 5-4. In addition, the DEC system utility program, DMP, will be used for data base dumps.

TABLE 5-1

ARTIFICIAL FULL SCENES FOR THE FUNCTIONAL TEST

Full Scene	Description	Purpose
A	Good quality scene	Test extraction, etc., of several areas of interest
B	Scene of bad quality	Test rejection of poor scene
C	Good quality scene	Test rejection of good scene which does not correspond to an area of interest
D	Marginal scene	Test screening and translation

All full scenes consist of fifteen rows, each containing approximately 3300 pixels (the equivalent of 100 nautical miles in width).

TABLE 5-2

AREAS OF INTEREST* FOR THE FUNCTIONAL TEST

A of I	Purpose
A-1	Verify header and ancillary data; verify large area extraction; write CCT for User A.
A-2	Validate small area extraction. Validate biases and gains computation.
A-3	Validate clouds for acceptance. Verify write CCT for User B.
A-4	Validate clouds for rejection; verify nonexistence on CCT for User A.
A-5	Validate zero fill.
B-2	Validate extract processor's ability to reject bad quality scene.
D-1 (8159)	Validate search area extract. Validate screening.
D-2 (8161)	Validate good translation and acceptance; write small area with header to CCT; validate CCT write's capability to pick area of interest from search area.
D-3 (4263)	Validate "three-try" translation and failure; verify that this area is not written to tape.

* All areas of interest are composed of four channels of data.

TABLE 5-3

REFERENCE IMAGES FOR THE FUNCTIONAL TEST

Reference Image	Corresponding Area of Interest
RD-2	D-2
RD-3	D-3

TABLE 5-4

SPECIAL TEST PROGRAMS FOR THE FUNCTIONAL TEST

Function of Program

1. Loader for simulated full scenes.
2. Loader for area of interest definition file.
3. System dump program, DMP, for dumping the following:
    - a. Full Scene Data Base
    - b. Search Area Data Base
    - c. Screening Map Data Base
    - d. Header & Ancillary Data
    - e. CCT Tape
4. LIMS for dumping the Master (Archive) Data Base
5. System utility, PIP, for listing search area data base file names.

5.2 TEST DATA FOR THE WORKING ENVIRONMENT TEST

5.2.1 GHIT AND HIGH DENSITY TAPES

An actual GHIT and its corresponding set of high density tapes will be used in this test.

5.2.2 LANDSAT FULL SCENES

Before the test a set of nine scenes will be selected from those available on the high density tapes. An effort will be made to select scenes with agricultural areas, although this is not a requirement and may not be feasible. Table 5-5 presents details.

5.2.3 AREAS OF INTEREST

After the full scenes for the test have been chosen, areas within them will be chosen as areas of interest. Characteristics are listed in Table 5-6.

5.2.4 REFERENCE IMAGE

A single reference image corresponding to one of the areas of interest will be selected as shown in Table 5-7. If feasible, this will consist of a separate image. If not feasible, a copy of an area of interest may be chosen to simulate a reference image.

5.2.5 SPECIAL COMPUTER PROGRAMS FOR THE WORKING ENVIRONMENT TEST

The test programs are listed in Table 5-8.

5.2.6 BATCH RUN STREAM - DATA BASE UPDATE PROGRAM

A batch run stream will be used to modify the Master (Archive) Data Base area of interest definitions at the beginning of the test.

5.3 RECOVERY TEST

All materials used in the recovery test are identical to those used in the Working Environment Test.

18

TABLE 5-5

FULL SCENES FOR THE WORKING ENVIRONMENT AND RECOVERY TESTS

Full Scene	Description	Purpose
E	Not Applicable	Test rejection of unneeded scene
F	Good quality	Test Extraction, Conditioning, & CCT Generate
G	Not Applicable	Test rejecting of unneeded scene
H	Not Applicable	Test rejection of unneeded scene
I	Not Applicable	Test rejection of unneeded scene
J	Not Applicable	Test rejection of unneeded scene
K	Good quality	Test Extraction Conditioning, and CCT Generate
L	Not Applicable	Test rejection of unneeded scene
M	Marginal quality	Test Screening & Translation

Note: By processing nine scenes, the Calcomp disk control access logic is validated.

TABLE 5-6

AREAS OF INTEREST FOR THE WORKING ENVIRONMENT AND RECOVERY TESTS

A of I	Description	Location on Full Scene	Purpose
F-1	TBD	TBD	Test Extraction, Conditioning, & CCT Generate
K-1	TBD	TBD	Test Extraction, Conditioning, & CCT Generate
M-1	TBD	TBD	Validate translation
X-1	TBD	Not to be extracted	Validate data base delete
X-2	TBD	Not to be extracted	Validate data base change
X-3	TBD	Not to be extracted	Validate data base add

20

TABLE 5-7

REFERENCE IMAGES FOR THE WORKING ENVIRONMENT & RECOVERY TESTS

Reference Image	Dimensions	Corresponding Area of Interest
RM-1	TBD	M-1

TABLE 5-8

SPECIAL TEST PROGRAMS FOR THE WORKING ENVIRONMENT TEST

Function of Program

1. Loader for area of interest definition file.
2. System dump program, DMP, for dumping the following:
    a. Full Scene Data Base
    b. Search Area Data Base
    c. Screening Map Data Base
    d. Header & Ancillary Data
    e. Reference Image Data Base
    f. CCT Tape
3. LIMS for dumping the Master (Archive) Data Base
4. System utility, PIP, for listing search area data base file names.

6. FUNCTIONAL TEST

This section furnishes instruction for the Functional Test. Major sub-sections treat the pretest preparation (6.1), test operations (6.2), post-test actions (6.3), and test verification (6.4).

6.1 PRE-TEST PREPARATION

These preparation tasks place the LIVES in an appropriate starting posture, and provide the means to subsequently verify that the Daily Data Base is initially empty; to verify the contents of the Area of Interest File; and to load and verify the contents of the Full Scene Data Base. The existence of an empty Search Area Data Base will also be subsequently verified. These tasks are all performed on the Support Processor by LIVES development team personnel using batch programs. The following will be accomplished:

1) Load Simulated Full Scene Data Base
2) Load Area of Interest Definition File
3) Load simulated reference images
4) Using system dump utility, DMP, dump Full Scene Data Base
5) Using LIMS dump Master (Archive) Data Base
6) List Search Area Data Base file names
7) List Screening Map Data Base file names

6.2 TEST OPERATIONS

Instructions on running the test are presented here. Verification of correct operation is found here for the Screening and Translation Processor. For other functions, this verification will be performed after post-test operations. At this point, the test begins by sequentially exercising the main processors. Each processor is run to completion after which the next processor is initiated.

1) Operator logs on to [5,5] on the Support Processor.

2) Operator readies the LIVES disk on DB1 and enters:

```
MCR>MOU DB1:LIVES
```

3) Operator runs the GHIT processor by entering the following command and following any instructions printed at the console:

```
MCR>BAT [333,33]GHITⓈ
```

4) Operator runs the Extract Processor by entering:

```
MCR>RUN [333,33]EXTRCT/UIC=[333,33] Ⓢ
```

5) Operator runs the Conditioning Processor by entering:

```
MCR>RUN [333,33]CONDTN/UIC=[333,33] Ⓢ
```

6) Operator dismounts the LIVES disk from DB1 by entering:

```
MCR>DMO DB1:
```

7) Operator logs off the Support Processor.
Switch the 88MB Disk, DB1, from the Support Processor to the Image processor by the following steps: a) physically dismount DB1: by stopping the disk; b) switch controller select switch on DB: from support system to image system (B to A); c) image system is now able to operate with three disks.

Note: Because users/operators have not yet been trained in the use of the LIVES system, a LIVES development team member will perform subsequent user steps to demonstrate and validate the Screening & Translation processor.

8) Operator logs on to [5,5] on the Image Processor, readies the LIVES disk on DB1 and the LIVES2 disk on DB2 and enters:

```
MCR>MOU DB1:LIVES
MCR>MOU DB2:LIVES2
```

9) A simulated user logs on to [333,33] at terminal TT1 of the Image Processor and executes the Screening and Translation Processor (MCR>RUN SCRNTR$)and furnishes the user identification 1, which corresponds to user A.

10) The system will present the identification of the first area of interest to be screened. At this time the user types -- "HELP".

11) The system presents the list of standard responses.

12) The user types LIST.

13) The system responds with a list of all areas of interest available for screening and translation. Verify that the list contains the following areas:

8159 (D-1) - for screening
8161 (D-2) - for screening and translation

At the same time, verify that no others are present. This step verifies that areas of interest and search areas are correctly selected for screening and translation.

14) The user types LONG.

15) The system again presents the identification of the first area of interest to be screened. From this point the system will always use the long form of messages to the user.

16) Choose to examine area D-1 typing -SELECT, then CR, and the four digit scene number. Long message appears again, Type CR. Display the area with all default parameters by typing a carriage return. The scene should display normally.

17) Instead of accepting or rejecting the area, type ALTER to change display parameters. Change parameters at the option of the Test User, and verify that the display changes accordingly.

18) Then, type A to accept the area. These two steps, 16) and 17), demonstrate the default screening options as well as the user options.

19) Select search area 8161 (D-2) to test translation by typing SELECT and the four digit scene number. Then type a carriage return to accept the default display parameters.

20) Pick a control point by positioning the cursor, as requested by the system, and depress the ESCAPE key.

21) Accept the default parameters for display of control point neighborhood by typing a carriage return.

22) The neighborhood of the control point will appear on the screen to the right (provided the correct color buttons are depressed, as specified by the message on the terminal screen).

23) The neighborhood of the control point on the reference image will appear on another channel, also specified by a message. Display that channel by depressing buttons on the Image-100 console.

24) In response to a message, display the reference image and position the cursor on the corresponding point on the reference image, and then depress the ESCAPE key.

25) In response to a message, display the original image and position the cursor on control point on the original control point neighborhood and depress the ESCAPE key.

26) Select another control point on the original image (not the first control point neighborhood). Move the cursor to it and depress ESCAPE.

27) Repeat steps 21) through 25) for this point. The control point neighborhood will appear below the original image.
At this point, if the translation required of the first pixel is within a single pixel of that for the second pixel, the system advises acceptance.
If they are within a single pixel, he should type-A to accept.
If he chooses to reject the entire image, he should type-R.
If he chooses to postpone a decision, he may type-SKIP to go on to the next area.
If the registration is not within one point, repeat steps 17) through 21).
If any two of the three registrations are within a single pixel, the system advises acceptance. The user may accept, reject, or postpone, as shown above.
If none are within a pixel, the system advises rejection. Again, the user may accept, reject, or postpone. He may also elect to force a translation by typing -FORCE and furnishing the translations in lines and pixels.

NOTE: For this test, test user should proceed until the translated image is accepted in any way. If it is not otherwise accepted, he should force its acceptance as described above. Acceptance is vital to the remainder of the test.

28) Test user as user A types EXIT.

29) Test user logs on as user 16, initiates the Screening and Translation Processor, SCRNTR, and furnishes user identification (16).

30) The user selects search area 4263 in some way. If not furnished automatically, he may use the -SELECT command. Verify that 4263 (D-3) appears on the screen.

31) Translate this search area also, as described in 16) through 23), except that the search should be somehow rejected. Rejection is important to continuation of the test.

32) Test user as user C logs off.

33) Switch the 88MB disk, DB-1, from the Image Processor to the support Processor by the following steps: a) Dismount DB1: (MCR>DMO DB1: (CR)); b) physically dismount DB1: by stopping the disk; c) switch controller select switch on DB1: to the support system.

34) Operator logs on to [5,5] on the Support Processor.

35) Operator readies the LIVES disk on DB1 and enters:

```
MCR>MOU DB1:LIVES
```

36) Operator runs the Conditioning Processor by entering:

```
MCR>RUN [333,33]CONDTN/UIC=[333,33] Ⓢ
```

37) Operator runs the CCT Write Processor by entering:

```
MCR>RUN [333,33]CCTGEN/UIC=[333,33] Ⓢ
```

The operator should respond to all console instructions and, when asked, should specify that all areas of interest are to be output. User A and User C labels should be affixed to the appropriate output tapes.

38) Operator runs daily report generator by entering:

```
MCR>BAT [333,33]DLYRPT Ⓢ
```

Note: At this point, test operations are complete.

6.3 POST-TEST ACTIONS

These post-test actions are aimed at obtaining evidence of the actual test operations which can be analyzed to verify proper functioning. A LIVES development team member will run a batch program to accomplish the following:

1) Dump CCT Tape for User A
2) Dump CCT Tape for User C
3) Dump Search Area Data Base
4) Dump Daily Data Base
5) Collect Standard Reports
6) Dump Screening map data base

6.4 TEST VERIFICATION

The following verification tasks will be accomplished to validate proper system functioning.

6.4.1 PRE-TEST SYSTEM STATUS (USE PRE-TEST DATA)

1) Using Full Scene Data Base Dump, verify existence of Full Scenes listed in Table 5-1.
2) Using Area of Interest Definition File Dump, verify presence of areas of interest listed in Table 5-2.
3) Using the list of Search Area Data Base file names, verify that the data base is empty.
4) Using Daily Data Base Dump, verify that no processing has taken place on any Landsat full scene.
5) Using list of file names from Screening Map Data Base verify that it is empty.

6.4.2 EXTRACT PROCESSOR VALIDATION (USE POST-TEST DATA AND PRE-TEST DATA AS NEEDED)

1) Using Search Area Data Base file names and imagery data verify that:
    a) All defined areas listed in Table 5-2 except area B-2 were extracted.

29

b) Area B-2 is absent validating that Full Scene B was of such poor quality that the Area of Interest was not extracted.

c) The last two pixels in each column of A-5 consists of zeros validating the zero-fill of pixels beyond the edge of a full scene.

d) Area D-1 is a search area containing a two pixel fringe on all sides. Bottom row of fringe will be zero fill.

2) Using the Header & Ancillary Data Dump, verify that the header and ancillary data for area A-1 corresponds to that same data for Full Scene A.

6.4.3 CONDITIONING PROCESSOR VALIDATION (USE POST-TEST DATA)

1) Using Search Area Data Base Dump, verify that:

   a) biases and gains exist for area A-2
   b) area A-3 still exists in spite of its cloud pixels

2) Using the Daily data base dump verify that the "reject" flag is set for area A-4. This demonstrates it was rejected on the basis of its cloud pixels.

3) Using the Screening Map file Data Base Dump, verify that:

   a) a screening map corresponding to area A-2 exists
   b) two screening maps corresponding to area D-2 exists. This verifies that bias and gains was recomputed after successful translation.

6.4.4 CCT WRITE PROCESSOR VALIDATION (USE POST-TEST DATA)

1) Using CCT tape dump(s), verify that:
   a) areas A-1, A-3, and D-2 which belong to User A are present and all others are absent.

   b) areas A-2, and D-1 which belong to User C are present and others are absent.

2) Comparing CCT tape Dump(s) and the dump of the full scene data base (pre-test) verify that the correct pixels were for A-1, A-3, D-2, A-2, and D-1.

6.4.5 REPORTS

Verify that reports properly reflect the test activity.

31

7. WORKING ENVIRONMENT TEST

This test is designed to test the LIVES in an operational mode. Whereas the Functional Test made use of artificial scenes, this one functions with actual Landsat scenes derived from a High Density Tape(s) and a GHIT. The two tests, of course, are complimentary: the Functional Test verifies individual functions in isolated application of each processor; this test demonstrates the major functions in a working environment.

7.1 PRE-TEST PREPARATION

Before the individual tests are performed, the LIVES must be made ready. Scenes will be loaded onto the disk from the high density tape by the HDTRS. The scenes on disk will be dumped, in abbreviated form, to paper, to show the existence of full scenes. The area-of-interest requirements data will be loaded into the master data base, and all the data records of the data base will be dumped.

These pre-test operations are performed on the Support Processor and the HDTRS. All operations will be performed by LIVES programmer personnel and HDTRS personnel prior to the test.

1) Load Full Scene Data Base
2) Load Area-of-Interest Requirements
3) Using System dump utility, DMP, dump Full Scene Data Base
4) Using LIMS dump Master (Archive) Data Base

7.2 TEST OPERATION

Instructions on running the test are presented here. Verification of correct operation is found here for the Screening and Translation Processor. For other functions, the verification will be performed after post-test operations. At this point the test begins with certain data base operations, after which the main processors are exercised sequentially. Each processor is run to completion, after which the next processor is initiated.

1) Operator logs on to [5,5] on the Support Processor.

2) Operator runs the Area of Interest Add Program by entering:

```
MCR>BAT [333,33]AOIADDⓈ
```

The operator will respond to instructions at the console to load data cards (shown in Figure 5-1), mount the Row-Path Tables Tape, and load the tape drive identifier card (located in operator's desk).

3) Operator runs the Area of Interest Update Program by entering:

```
MCR>BAT [333,33]AOIUPD Ⓢ
```

The operator will respond to console instructions to load the data cards (shown in Figure 5-1).

4) Operator runs the Area of Interest Delete Program by entering:

```
MCR>BAT [333,33]AOIDELⓈ
```

The operator will respond to console instructions to load the data cards (shown in Figure 5-1).

5) Operator readies the LIVES disk on DB1 and enters:

```
MCR>MOU DB1:LIVES
```

6) Operator runs the GHIT processor by entering the following command and following any instructions printed at the console:

```
MCR>BAT [333,33]GHITⓈ
```

7) Operator runs the Extract Processor by entering:

```
MCR>RUN [333,33]EXTRCT/UIC=[333,33]Ⓢ
```

The operator then immediately initiates the PDP 11/20 and the HDTRS per Ford Aerospace instructions.

8) Operator runs the Conditioning Processor by entering:

```
MCR>RUN [333,33]CONDTN/UIC=[333,33]Ⓢ
```

9) Operator dismounts the LIVES disk from DB1 by entering:

```
MCR>DMO DB1:
```

10) Operator logs off the Support Processor

11) Switch the 88 megabyte disk, DB-1, from the Support Processor to the Image Processor by the following steps: a) physically dismount DB1: by stopping the disk; b) switch controller select switch on DB: from support system to image system (B to A); c) image system is now able to operate with three disks.

Note: Because users and operators have not yet been trained in the use of LIVES, a development team member will perform subsequent user steps to demonstrate and validate the Screening and Translation Processor.

12) Operator logs on to [5,5] on the Image Processor.

13) Operator readies the LIVES disk on DB1 and the LIVES2 disk on DB2 and enters:

```
MCR>MOU DB1:LIVES
MCR>MOU DB2:LIVES2
```

14) Operator runs the Reference Image Load Program by entering the following command and following any console instructions received:

```
MCR>BAT [333,33]REFLOD Ⓢ
```

15) A simulated user logs on to [333,33] at terminal TT1 of the Image Processor and executes the Screening and Translation Processor (`MCR>RUN SCRNTR Ⓢ`) and furnishes the user identification.

16) The system will present the identification of the first area of interest to be screened or translated.

17) The user types "LIST".

18) The system responds with a list of all areas of interest available for screening and translation. Verify that M-1 is present.

19) Select Search Area M-1 to test translation by typing SELECT and the four digit scene number. Verify that M1 appears on the screen.

20) Translate search area M-1 to the reference image with three carefully selected control points at the option of the user. Verify the translation is performed, and accept the translated area.

21) User log off.

22) Operator dismounts the LIVES and LIVES2 disks by entering:

```
MCR>DMO DB1:
MCR>DMO DB2:
```

23) Operator logs off the Image Processor.

25) Switch the 88 megabyte disk, DB-1, from the Image Processor to the Support Processor by the following steps: a) physically dismount DB1: by stopping the disk; b) switch controller select switch on DB1: to the support system.

26) Operator logs on to [5,5] on the Support Processor.

27) Operator readies the LIVES disk on DB1 and enters:

```
MCR>MOU DB1:LIVES
```

28) Operator runs the Conditioning Processor by entering:

```
MCR>RUN [333,33]CONDTN/UIC=[333,33]$⃝
```

29) Operator runs the CCT Write Processor by entering:

```
MCR>RUN [333,33]CCTGEN/UIC=[333,33]$⃝
```

The operator should respond to all console instructions and, when asked, should specify that all areas of interest are to be output. User labels should be affixed to the appropriate output tapes.

30) Operator runs daily report generator by entering:

```
MCR>BAT [333,33]DLYRPT$⃝
```

Note: At this point "Test Operations" are complete.

7.3 POST-TEST ACTIONS

These post-test actions are aimed at obtaining evidence of the actual test operations which can be analyzed to verify proper functioning. A LIVES development team member will run a batch program to accomplish the following:

1) Dump the CCT produced in the test
2) List Search Area Data Base file names
3) Dump the Search Area Data Base
4) Dump the Daily Data Base
5) Dump the Master (Archive) Data Base
6) Dump the Reference Image Data Base
7) Dump the Screening Map Data Base

7.4 TEST VERIFICATION

The following verification tasks will be accomplished to validate proper system functioning:

7.4.1 PRE-TEST SYSTEM STATUS (USE PRE-TEST DATA)

1) Using Full Scene Data Base dump(s), verify the existence of Full Scenes listed in Table 5-5.
2) Using Master (Archive) Data Base Dump, verify presence of areas of interest listed in Table 5-6. (Note AofI X-3 should not be present).

7.4.2 DATA BASE OPERATIONS VALIDATION (USE POST-TEST DATA)

Using Master (Archive) Data Base dump verify that AofI X-1 has been deleted that AofI X-2 has been changed, and that AofI X-3 has been added.

7.4.3 GHIT PROCESSOR VALIDATION (USE POST-TEST DATA)

Verify that the GHIT Report reflects appropriate data regarding HDT scenes to be processed.

7.4.4 EXTRACT PROCESSOR VALIDATION (USE PRE-AND POST-TEST DATA)

1) Using Search Area Data Base file names verify that: Areas of interest F-1, K-1, and M-1 were extracted.
2) Using Search Area Data Base dump verify that header and ancillary data for Area of Interst F-1 corresponds to that same data for Full Scene F.

7.4.5 CONDITIONING PROCESSOR VALIDATION (USE POST-TEST DATA)

1) Using Search Area Data Base dump verify that biases & gains exist for Area of Interest F-1.

2) Using the Screening Map File dump verify that two screening maps corresponding to Area of Interest M-1 exist. This verifies that biases & gains were initially computed and then recomputed after successful translation.

7.4.6 CCT WRITE PROCESSOR VALIDATION (USE POST-TEST DATA)

Using CCT tape dump, verify that that Areas of Interest F-1, K-1, and M-1 are present and all others are absent. By selective comparison verify the accuracy of F-1, K-1, and M-1 on the CCT dump.

7.4.7 REPORTS

Verify that reports properly reflect the test activity.

8. RECOVERY TEST

This test demonstrates that LIVES can recover from computer failures with minimum loss of processing time. It is run identically to the Working Environment Test. This test validates the Extract, Conditioning, Screening and Translation, and CCT Processors.

8.1 PRE-TEST PREPARATION

Preparations are identical to those for the Working Environmental Test.

8.2 TEST OPERATIONS

The test operations described in Section 7.2 will be repeated here except as modified below. In all cases, computer failures are simulated by an abort command. Since processing is quite rapid in some processors, the command should be issued almost immediately after initiation of the processor.

The following steps are modifications to the test script from Section 7.2. In each case, the name of the processor and the name of the file will be different:

1) Log on to [5,5] if necessary.

2) Run the processor by typing the following, using the command string specified for the processor.

```
RUN [333,33]XXXXXX/UIC=[333,33] Ⓢ (where XXXXXX
          is EXTRCT, CONDTN, SCRNTR, AND CCTGEN)
```

3) Abort the run by typing

```
Control C

ABO XXXXXX
```

4) Initiate the recovery process by typing

```
BAT [333,33]LIVESRCVYⓈ
```

5) Re-initiate the appropriate processor with the appropriate run command and allow it to run to completion.

Note: When Steps 1 thru 5 have been accomplished for each of the primary processors, Recovery "Test Operations" are completed.

8.3 POST-TEST ACTIONS

Post-test actions are identical to those outlined in Section 7.3.

8.4 TEST VERIFICATION

The final results of file dumps should be the same as those generated by the Working Environment Test.

4

9.0 APPENDICES

These appendices contain test specifications for approved modifications to the LIVES as authorized by the appropriate Transmittal Informative Request Form (TIRF). Each appendix will reference the TIRF or group of TIRFs for which the test applies. Appendices will continue to be included in this document until a new version of LIVES is released requiring a separate acceptance test specification.

JSC-14635

APPENDIX NUMBER 9.1

ACCEPTANCE TEST SPECIFICATIONS
OF THE
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES)

TRANSMITTAL 79-0031
LIVES MODIFICATIONS

Prepared By
D. K. McCarley

Approved By

LEC

J. I. Morrow, Supervisor
Software Section

NASA

J. M. Sulester, Technical Monitor
Systems and Facilities Branch

Prepared By
Lockheed Electronics Company, Inc.
For
Earth Observations Division
Space and Life Sciences Directorate

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

December 1979

LEC-12900
APPENDIX 9.1

CONTENTS

ACCEPTANCE TEST SPECIFICATIONS OF THE LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES)

APPENDIX NUMBER 9.1

SECTION PAGE

1. SCOPE. 1-1

2. APPLICABLE DOCUMENTS 2-1

3. QUALITY ASSURANCE. 3-1

   3.1 GENERAL 3-1

   3.2 ACCEPTANCE CRITERIA 3-1

4. TEST DATA. 4-1

   4.1 GENERAL 4-1

   4.2 AREA-OF-INTEREST ADD PROCESS 4-1

   4.3 AREA-OF-INTEREST UPDATE PROCESS 4-1

   4.4 AREA-OF-INTEREST DELETE PROCESS 4-2

   4.5 GHIT PROCESS. 4-2

   4.6 EXTRACT PROCESS 4-2

   4.7 ARCHIVE UPDATE PROCESS. 4-3

5. TEST SCRIPT. 5-1

6. TEST VERIFICATION. 6-1

   6.1 GENERAL 6-1

   6.2 AREA-OF-INTEREST ADD PROCESS. 6-1

   6.3 AREA-OF-INTEREST UPDATE PROCESS 6-1

SECTION PAGE

6.4 AREA-OF-INTEREST DELETE PROCESS 6-2

6.5 GHIT PROCESS 6-2

6.6 EXTRACT PROCESS 6-3

6.7 ARCHIVE UPDATE PROCESS 6-3

APPENDIX A - TEST DATA TABLES A-1

TABLES

Table Page

A-1 First Set of Input Card Images for the Area-of-Interest Add Process Test. A-1

A-2 Second Set of Input Card Images for the Area-of-Interest Add Process Test A-5

A-3 Input Card Images for the Area-of-Interest Update Process Test A-6

A-4 Input Card Images for the Area-of-Interest Delete Process Test A-10

A-5 Area-of-Interest Fields for the GHIT Process Test . . . A-11

A-6 Area-of-Interest Fields for the Extract Process Test. . A-12

A-7 Summary Contents of First GHIT. A-13

A-8 Summary Contents of Second GHIT A-14

1. SCOPE

This document outlines the testing necessary to demonstrate the satisfactory completion of the requirements of Transmittal 79-0031, which called for modifications to the Landsat Imagery Verification and Extraction System (LIVES). These modifications were basically the addition of new descriptive fields in the Area-of-Interest records and the use of these fields in the selection process.

2. APPLICABLE DOCUMENTS

The following documents are available to provide more detailed information on the LIVES than is presented in these test specifications:

1. User's Manual, JSC-14632, LEC-12902, March 1979
2. Operation's Manual, JSC-14633, LEC-12903, August 1979
3. "As-Built" Design Specification, JSC-14634, LEC-12904, August 1979
4. Transmittal 79-0031

3. QUALITY ASSURANCE

3.1 GENERAL

The Quality Assurance Test Witness will ensure that all procedures have been executed, that all output products are correct or within tolerances, and that all modules function as they should. After completion, the Test Preparation Sheet will be completed and signed by persons responsible for each function listed thereon to show approval within his function.

3.2 ACCEPTANCE CRITERIA

Where applicable, a test will be deemed successful if the output generated by the test is identical to the expected output. Response times and other subjective measurements will be deemed sucessful or unsuccessful by the Test Conductor. If failures or discrepancies occur, they will be noted. In case of problems, a particular test may be suspended at the discretion of the Test Conductor. After problems are resolved, that specific test will recommence at the location specified by the Test Conductor.

4. TEST DATA

4.1 GENERAL

Several portions of the LIVES processing cycle are affected by the existence and usage of the new fields required by Transmittal 79-0031. The new fields are the Primary/Secondary Scene Selection indicator (PSSSEL) and the Satellite Selection indicator (SATSEL), and these fields are maintained in the Area-of-Interest Description Records in the LIVES data base. Maintenance of these fields is accomplished via the Area-of-Interest Add, Update, and Delete Processes. Usage of these fields is in the Goddard High Density Index Tape (GHIT) and Extract Processes. The Archive Update Process is tested to ensure the correct operation of revised data base formats.

4.2 AREA-OF-INTEREST ADD PROCESS

In addition to the two new fields PSSSEL and SATSEL, the user now requires the ability to initially input the Primary World Reference System Row-Path (PWRSRP), Secondary World Reference System Row-Path (SWRSRP), Area-of-Interest Size in Lines (AILNES), and Area-of-Interest Size in Pixels (AIPXLS) fields. The Area-of-Interest Add Process has been modified to accept all new input fields as described above, to perform more extensive editing of input data, to continue processing if an input data error occurs, and to automatically generate PWRSRP and SWRSRP only if both fields are blank on input. The Area-of-Interest Add Process will be run on the sets of input data shown in Table A-1 and Table A-2 to demonstrate its proper operation.

4.3 AREA-OF-INTEREST UPDATE PROCESS

Similar to the Area-of-Interest Add Process, the Area-of-Interest Update Process has been modified to handle the PSSSEL, SATSEL, PWRSRP, SWRSRP, AILNES, and AIPXLS fields, to perform more extensive editing of input data, and to continue processing if an input data error occurs. It will be run on the set of input data in Table A-3.

4.4 AREA-OF-INTEREST DELETE PROCESS

This process has been modified to perform more extensive editing of input data, to continue processing if an input data error occurs, and to delete all the associated Acquisition Description Records when an Area-of-Interest Description Record is deleted. It will be run on the set of input data shown in Table A-4.

4.5 GHIT PROCESS

The modifications to this process cause the new fields to be used in the selection process and transferred to the daily data base. Also an exhaustive listing of the daily data base contents has been added to the GHIT batch run for user convenience. The GHIT process will be performed twice so that tapes from both Landsat 2 (L0XGT7932703) and Landsat 3 (L0XGT7934905) may be used. Table A-5 lists the pertinent fields from the Areas-of-Interest which will be used to demonstrate the proper operation of the selection process.

4.6 EXTRACT PROCESS

It was necessary to modify the Extract Process to print an error message if an Area-of-Interest had an erroneous row-path (based on its latitude and longitude). Previously, no check was made because the row-path was computer-generated using the same algorithm used for extraction. Now, however, the row-path specified by the user may be wrong and must be checked. Area-of-Interest number 1818 for user 18 will intentionally have a row-path which does not match its latitude and longitude to test this Extract Process modification. High Density Tape number L3MHP7934901 will be used.

In addition, the Extract Processor has been modified to be more functional for the user in the area of selection or rejection of Areas-of-Interest for extraction based on the relationship between the two fields Registration Quality Threshold for Rejection (REGQTR) and Registration Quality Threshold for Screening (REGQTS) (both of which are user-specified in an Area-of-Interest Description Record via the LIVES System Parameter File contents at extraction time) and the field Quality Assessment of Geometric Model (QAGEOM) (which is present for each scene on a GHIT). Previously, the Extract Processor made the following decisions:

> If QAGEOM $\leq$ REGQTR, do not extract.
> Then if QAGEOM > REGQTS, extract only an Area-of-Interest; otherwise extract a Search Area.

Based on these decisions, when the GHIT contained a value of zero for QAGEOM, nothing could be extracted from this scene because the minimum value that REGQTR could contain (being a one character field) was zero. The Extract Processor has been changed to make the following decisions:

> If QAGEOM < REGQTR, do not extract.
> Then if QAGEOM $\geq$ REGQTS, extract only an Area-of-Interest; otherwise extract a Search Area.

Now the user can force an Area-of-Interest to be extracted regardless of QAGEOM by setting REGQTR and REGQTS to zero. Table A-6 lists the pertinent fields from the Areas-of-Interest which will be used to demonstrate the extraction decision process.

4.7 ARCHIVE UDPATE PROCESS

Having changed several formats in the data base, the Archive Update Process will be run to ensure that it properly transfers all Scene Description and Acquisition Description Records from the Daily Data Base to the Master Data Base without disturbing those already in the Master Data Base. The test data are those records in the data bases at the conclusion of the Extract Process test described above.

5. TEST SCRIPT

The following steps describe the operations needed to perform this test. Each step is to be completed before moving to the next one. The line printer and operator's console output will be used for test verification.

1. Log on to [5,5] on the Support Processor, slave all terminals, and dismount all tapes and disks (except DB0).
2. Run beginning batch job to set up test data base:

   ```
   MCR>BAT [333,33]T0031B  (ALT)
   ```

3. Run Area-of-Interest Add Process:

   ```
   MCR>BAT [333,33]AOIADD  (ALT)
   ```

   Note: There are no physical input cards.
4. Dump the Master Data Base to the printer:

   ```
   MCR>BAT [333,33]MDBDMP  (ALT)
   ```

5. Update the input file for the Area-of-Interest Add Process:

   ```
   MCR>PIP [333,33]AOIADD.DT1/UP=[333,33]931AOIADD.DT1  (CR)
   ```

6. Run Area-of-Interest Add Process:

   ```
   MCR>BAT [333,33]AOIADD  (ALT)
   ```

   Note: There are no physical input cards.
7. Dump the Master Data Base to the printer:

   ```
   MCR>BAT [333,33]MDBDMP  (ALT)
   ```

8. Run Area-of-Interest Update Process:

   ```
   MCR>BAT [333,33]AOIUPD  (ALT)
   ```

   Note: There are no physical input cards.
9. Dump the Master Data Base to the printer:

   ```
   MCR>BAT [333,33]MDBDMP   (ALT)
   ```

10. Run the Area-of-Interest Delete Process:

    ```
    MCR>BAT [333,33]AOIDEL  (ALT)
    ```

    Note: There are no physical input cards.

11. Dump the Master Data Base to the printer:

    ```
    MCR>BAT [333,33]MDBDMP  (ALT)
    ```

12. Ready the RP04 disk labelled "LIVES" on DB1 (switch set for Support port) and enter:

    ```
    MCR>MOU DB1:LIVES  (CR)
    ```

13. Ready the GHIT number L0XGT7932703 (without a write ring) on MT0 and enter:

    ```
    MCR>MOU MT0:/CHA=[FOR]  (CR)
    ```

14. Run the GHIT Process (using only the mounted tape and responding to any console instructions):

    ```
    MCR>BAT [333,33]GHIT  (ALT)
    ```

15. Replace the tape on MT0 with GHIT number L0XGT7934905 (without a write ring) and run the GHIT Process:

    ```
    MCR>BAT [333,33]GHIT  (ALT)
    ```

16. Dismount the GHIT:

    ```
    MCR>DMO MT0:  (CR)
    ```

17. Ready two RP06 scratch disks on DA0 and DA1 disk drives (switches set for: 11/20 ACCESS-ON; 11/45 ACCESS-ON; READ/WRITE) and enter:

    ```
    MCR>MOU DA0:/CHA=[FOR]  (CR)

    MCR>MOU DA1:/CHA=[FOR]  (CR)
    ```

18. Mount High Density Tape number L3MHP7934901 on its drive and position it to time 001.00.09.19.

19. Initiate the HDTRS on the 11/20 per Ford Aerospace instructions, using dual mode option, MSS data option, 7.5 IPS

speed option, and setting both disk drives available initially. Enter start time of 001.00.09.39 and stop time of 001.00.12.21. When the SCI time display reads greater than 001.00.09.59, log on to [333,33] on the Support Processor and enter:

```
MCR>RUN EXTRCT   (ALT)
```

Note: NO communication with the Support Processor should take place until the "EXTRCT -- STOP" message is received.

20. Dump the Daily Data Base to the printer:

```
MCR>BAT  PCSDMP  (ALT)
```

21. Print a directory of the files on DB1 and dump an Area-of-Interest:

```
MCR>PIP  LP:=DB1:/LI    (CR)
MCR>DMP  LP:=DB1:180004.SAI/BY (CR)
```

22. Log on to [5,5] and run the Archive Update Process:

```
MCR>BAT [333,33]ARCUPD   (ALT)
```

23. Run ending batch job to dump Master Data Base to printer and restore production data base.

```
MCR>BAT [333,33]T0031E   (ALT)
```

6. TEST VERIFICATION

6.1 GENERAL

The line printer output and the operator's console output will be retrieved at the end of the test and will be used along with an Area-of-Interest dump from the old software to verify the proper operation of the modifications made to the six processes as described below.

6.2 AREA-OF-INTEREST ADD PROCESS

1) Verify that new areas-of-interest which had no input data errors were added to the data base and that the values in the new fields were stored properly.
2) Verify that the process did not stop when an input data error was encountered.
3) Verify that attempts to add existing areas-of-interest were flagged and ignored.
4) Verify that PWRSRP and SWRSRP were calculated automatically only when both were missing on input.
5) Verify that the following types of errors were detected:
    a) Card sequence
    b) Card type
    c) Non-integer character in integer field
    d) Illegal values where generally known limitations exist

6.3 AREA-OF-INTEREST UPDATE PROCESS

1) Verify that existing areas-of-interest which had no input data errors had their fields changed as indicated by the change cards.
2) Verify that the process did not stop when an input data error was encountered.
3) Verify that attempts to update non-existent areas-of-interest were flagged.

4) Verify that the following types of errors were detected:
    a) Card sequence
    b) Card type
    c) Non-integer character in integer field
    d) Illegal values where generally known limitations exist

5) Verify that existing field values did not change unless specifically changed.

6.4 AREA-OF-INTEREST DELETE PROCESS

1) Verify that existing areas-of-interest which had no input data errors were deleted from the data base, along with their associated Acquisition Description Records.

2) Verify that attempts to delete non-existent areas-of-interest were flagged.

3) Verify that the process did not stop when an input data error was encountered.

4) Verify that the following types of errors were detected:
    a) Card type
    b) Non-integer character in integer field
    c) Illegal values where generally known limitations exist

6.5 GHIT PROCESS

1) Verify that an area-of-interest is selected to be extracted from a particular scene based on a proper combination of the PWRSRP, SWRSRP, PSSSEL, SATSEL, ACQSRT, and ACQSTP fields.

2) Verify that the Daily Data Base built by the GHIT processor contains the new PSSSEL and SATSEL fields in the Areas-of-Interest Description Records.

6.6 EXTRACT PROCESS

1) Verify that the Area-of-Interest with USERID=18 and AOIID=1818 caused an error printout and was not extracted.

2) Verify that the interaction of the QAGEOM, REGQTR, and REGQTS fields was as predicted by Table A-6.

6.7 ARCHIVE UPDATE PROCESS

1) Verify that all Scene Description Records were transferred from the Daily to the Master Data Base.

2) Verify that all Acquisition Description Records were transferred from the Daily to the Master Data Base.

APPENDIX A

TEST DATA TABLES

TABLE A-1

First Set of Input Card Images for the Area-of-Interest Add Process Test

```
A TEST               01 0123 0321                12         038020 038021 0 234
2 2800   W N031/06 W085/45 0 3201 00117 00196
3 2800  9005                                      0360
A TEST               01 0123 0321                1X         038020 038021 0 234
2 2801   W N031/06 W085/45 0 3201 00117 00196
3 2801  9005                                      0360
A TEST               01 0123 0321                12         03X020 038021 0 234
2 2802   W N031/06 W085/45 0 3201 00117 00196
3 2802  9005                                      0360
A TEST               01 0123 0321                12         03802X 038021 0 234
2 2803   W N031/06 W085/45 0 3201 00117 00196
3 2803  9005                                      0360
A TEST               01 0123 0321                12         038020 03X021 0 234
2 2804   W N031/06 W085/45 0 3201 00117 00196
3 2804  9005                                      0360
A TEST               01 0123 0321                12         038020 03802X 0 234
2 2805   W N031/06 W085/45 0 3201 00117 00196
3 2805  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 X 234
2 2806   W N031/06 W085/45 0 3201 00117 00196
3 2806  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 2X4
2 2807   W N031/06 W085/45 0 3201 00117 00196
3 2807  9005                                      0360
A TEST               01 0123 0321                00         038020 038021 0 234
2 2808   W N031/06 W085/45 0 3201 00117 00196
3 2808  9005                                      0360
A TEST               01 0123 0321                20         038020 038021 0 234
2 2809   W N031/06 W085/45 0 3201 00117 00196
3 2809  9005                                      0360
A TEST               01 0123 0321                12         000020 038021 0 234
2 2810   W N031/06 W085/45 0 3201 00117 00196
3 2810  9005                                      0360
A TEST               01 0123 0321                12         249020 038021 0 234
2 2811   W N031/06 W085/45 0 3201 00117 00196
3 2811  9005                                      0360
A TEST               01 0123 0321                12         038    038021 0 234
2 2812   W N031/06 W085/45 0 3201 00117 00196
3 2812  9005                                      0360
A TEST               01 0123 0321                12         038252 038021 0 234
2 2813   W N031/06 W085/45 0 3201 00117 00196
3 2813  9005                                      0360
A TEST               01 0123 0321                12         038020    021 0 234
2 2814   W N031/06 W085/45 0 3201 00117 00196
3 2814  9005                                      0360
A TEST               01 0123 0321                12         038020 249021 0 234
2 2815   W N031/06 W085/45 0 3201 00117 00196
3 2815  9005                                      0360
A TEST               01 0123 0321                12         038020 038000 0 234
2 2816   W N031/06 W085/45 0 3201 00117 00196
3 2816  9005                                      0360
A TEST               01 0123 0321                12         038020 038252 0 234
2 2817   W N031/06 W085/45 0 3201 00117 00196
3 2817  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
```

TABLE A-1 (cont.)

```
2 X218   W N031/06 W085/45 0 3201 00117 00196
3 2818  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2819   W NX31/06 W085/45 0 3201 00117 00196
3 2819  9005                                      0360
A TEST               01 0123 0321                12         039020 038021 0 234
2 2820   W N031/X6 W085/45 0 3201 00117 00196
3 2820  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2821   W N031/06 WX85/45 0 3201 00117 00196
3 2821  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2822   W N031/06 W085/X5 0 3201 00117 00196
3 2822  9005                                      0360
A TEST               01 0123 0321                12         036020 038021 0 234
2 2823   W N031/06 W085/45 0 3201 X0117 00196
3 2823  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2824   W N031/06 W085/45 0 3201 00117 X0196
3 2824  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 0000   W N031/06 W085/45 0 3201 00117 00196
3 2825  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2826   W W031/06 W085/45 0 3201 00117 00196
3 2826  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2827   W N031/06 N085/45 0 3201 00117 00196
3 2827  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2828   W N-31/06 W085/45 0 3201 00117 00196
3 2828  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2829   W N091/06 W085/45 0 3201 00117 00196
3 2829  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2830   W N031/-6 W085/45 0 3201 00117 00196
3 2830  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2831   W N031/60 W085/45 0 3201 00117 00196
3 2931  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2832   W N031/06 W-85/45 0 3201 00117 00196
3 2832  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2833   W N031/06 W181/45 0 3201 00117 00196
3 2833  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2834   W N031/06 W085/-5 0 3201 00117 00196
3 2834  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2835   W N031/06 W085/60 0 3201 00117 00196
3 2835  9005                                      0360
A TEST               01 0123 0321                12         039020 038021 0 234
2 2836  ,W N031/06 W085/45 0 3201 02934 00196
```

TABLE A-1 (cont.)

```
3 2836  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2836   W N031/06 W085/45 0 3201    -5 00196
3 2836  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2837   W N031/06 W085/45 0 3201 00117 03550
3 2837  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2837   W N031/06 W085/45 0 3201 00117   -10
3 2837  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2838   W N031/06 W085/45 0 3201 00117 00196
3 X238  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2839   W N031/06 W085/45 0 3201 00117 00196
3 2839  X005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2840   W N031/06 W085/45 0 3201 00117 00196
3 2840  9X05                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2841   W N031/06 W085/45 0 3201 00117 00196
3 2841  9005                                      X360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2842   W N031/06 W085/45 0 3201 00117 00196
3 2842  9005                                      036X
A TEST               01 0123 0321                12         038020 038021 0 234
2 2843   W N031/06 W085/45 0 3201 00117 00196
3 1343  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2844   W N031/06 W085/45 0 3201 00117 00196
3 2844  9000                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2845   W N031/06 W085/45 0 3201 00117 00196
3 2845  9367                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2846   W N031/06 W085/45 0 3201 00117 00196
3 2846  9005                                      0000
A TEST               01 0123 0321                12         038020 038021 0 234
2 2847   W N031/06 W085/45 0 3201 00117 00196
3 2847  9005                                      0367
A TEST               01 0123 0321                12         038020 038021 0 234
3 2848  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2849   W N031/06 W085/45 0 3201 00117 00196
3 2849  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2850   W N031/06 W085/45 0 3201 00117 00196
A TEST               01 0123 0321                12         038020 038021 0 234
2 2851   W N031/06 W085/45 0 3201 00117 00196
3 2851  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
3 2852  9005                                      0360
2 2852   W N031/06 W085/45 0 3201 00117 00196
A TEST               01 0123 0321                12         038020 038021 0 234
2 2853   W N031/06 W085/45 0 3201 00117 00196
```

TABLE A-1 (concl.)

```
3 2853  9005                                          0360
A TEST              01 0123 0321                      12         038020 038021 0 234
2 2854   W N031/06 W085/45 0 3201 00117 00196
3 2854  9005                                          0360
Q TEST              01 0123 0321                      12         038020 038021 0 234
2 2855   W N031/06 W085/45 0 3201 00117 00196
3 2855  9005                                          0360
S TEST              01 0123 0321                      12         038020 038021 0 234
2 2856   W N031/06 W085/45 0 3201 00117 00196
3 2856  9005                                          0360
A TEST              01 0123 0321                      12         038020 038021 0 234
A TEST              01 0123 0321                      12         038020 038021 0 234
2 2857   W N031/06 W085/45 0 3201 00117 00196
3 2857  9005                                          0360
3 2800  9005                                          0360
A TEST              01 0123 0321                      12         038020 038021 0 234
2 2858   W N031/06 W085/45 0 3201 00117 00196
3 2858  9005                                          0360
A TEST              01 0123 0321                      12                038021 0 234
2 2859   W N031/06 W085/45 0 3201 00117 00196
3 2859  9005                                          0360
A TEST              01 0123 0321                      12         038020        0 234
2 2860   W N031/06 W085/45 0 3201 00117 00196
3 2860  9005                                          0360
A TEST              01 0123 0321                      12                       0 234
2 2861   W N031/06 W085/45 0 3201 00117 00196
3 2861  9005                                          0360
A TEST              01 0123 0321                      12         038020 038021
2 2862   W N031/06 W085/45 0 3201 00117 00196
3 2862  9005                                          0360
A TEST              01 0123 0321                      12         038020 038021 0 234
2 2863   W N031/06 W085/45 0 3201       00196
3 2863  9005                                          0360
A TEST              01 0123 0321                      12         038020 038021 0 234
2 2864   W N031/05 W085/45 0 3201 00117
3 2864  9005                                          0360
A TEST              01 0123 0321                      12         038020 038021 0 234
2 2865   W N031/06 W085/45 0 3201
3 2865  9005                                          0360
```

TABLE A-2

Second Set of Input Card Images for the Area-of-Interest Add Process Test

```
A TEST               01 0123 0321                12         038020 038021 0 234
2 2800   W N031/06 W085/45 0 3201 00117 00196
3 2800  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2854   W N031/06 W085/45 0 3201 00117 00196
3 2854  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2857   W N031/06 W085/45 0 3201 00117 00196
3 2857  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2858   W N031/06 W085/45 0 3201 00117 00196
3 2858  9005                                      0360
A TEST               01 0123 0321                12                038021 0 234
2 2859   W N031/06 W085/45 0 3201 00117 00196
3 2859  9005                                      0360
A TEST               01 0123 0321                12         038020        0 234
2 2870   W N031/06 W085/45 0 3201 00117 00196
3 2870  9005                                      0360
A TEST               01 0123 0321                12         038020 038021
2 2871   W N031/06 W085/45 0 3201 00117 00196
3 2871  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2872   W N031/06 W085/45 0 3201       00196
3 2872  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2873   W N031/06 W085/45 0 3201 00117
3 2873  9005                                      0360
A TEST               01 0123 0321                12         038020 038021 0 234
2 2874   W N031/06 W085/45 0 3201
3 2874  9005                                      0360
```

TABLE A-3

Input Card Images for the Area-of-Interest Update Process Test

```
C                                              12
2 2800
3 2800
C TEST              01 0123 0321               1X        038020 038021 0 234
2 2801   W N031/06 W085/45 0 3201 00117 00196
3 2801  9005                                    0360
C TEST              01 0123 0321               12        03X020 038021 0 234
2 2802   W N031/06 W085/45 0 3201 00117 00196
3 2802  9005                                    0360
C TEST              01 0123 0321               12        03802X 038021 0 234
2 2803   W N031/06 W085/45 0 3201 00117 00196
3 2803  9005                                    0360
C TEST              01 0123 0321               12        038020 03X021 0 234
2 2804   W N031/06 W085/45 0 3201 00117 00196
3 2804  9005                                    0360
C TEST              01 0123 0321               12        038020 03802X 0 234
2 2805   W N031/06 W085/45 0 3201 00117 00196
3 2805  9005                                    0360
C TEST              01 0123 0321               12        038020 038021 X 234
2 2806   W N031/06 W085/45 0 3201 00117 00196
3 2806  9005                                    0360
C TEST              01 0123 0321               12        038020 038021 0 2X4
2 2807   W N031/06 W085/45 0 3201 00117 00196
3 2807  9005                                    0360
C TEST              01 0123 0321               00        038020 038021 0 234
2 2808   W N031/06 W085/45 0 3201 00117 00196
3 2808  9005                                    0360
C TEST              01 0123 0321               20        038020 038021 0 234
2 2809   W N031/06 W085/45 0 3201 00117 00196
3 2809  9005                                    0360
C TEST              01 0123 0321               12        000020 038021 0 234
2 2810   W N031/06 W085/45 0 3201 00117 00196
3 2810  9005                                    0360
C TEST              01 0123 0321               12        249020 038021 0 234
2 2811   W N031/06 W085/45 0 3201 00117 00196
3 2811  9005                                    0360
C TEST              01 0123 0321               12        038    038021 0 234
2 2812   W N031/06 W085/45 0 3201 00117 00196
3 2812  9005                                    0360
C TEST              01 0123 0321               12        038252 038021 0 234
2 2813   W N031/06 W085/45 0 3201 00117 00196
3 2813  9005                                    0360
C TEST              01 0123 0321               12        038020    021 0 234
2 2814   W N031/06 W085/45 0 3201 00117 00196
3 2814  9005                                    0360
C TEST              01 0123 0321               12        038020 249021 0 234
2 2815   W N031/06 W085/45 0 3201 00117 00196
3 2815  9005                                    0360
C TEST              01 0123 0321               12        038020 038000 0 234
2 2816   W N031/06 W085/45 0 3201 00117 00196
3 2816  9005                                    0360
C TEST              01 0123 0321               12        038020 038252 0 234
2 2817   W N031/06 W085/45 0 3201 00117 00196
3 2817  9005                                    0360
C TEST              01 0123 0321               12        038020 038021 0 234
```

TABLE A-3 (cont.)

```
2 X218   W N031/06 W085/45 0 3201 00117 00196
3 2818  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2819   W NX31/06 W035/45 0 3201 00117 00196
3 2819  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2820   W N031/X6 W085/45 0 3201 00117 00196
3 2820  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2821   W N031/06 WX85/45 0 3201 00117 00196
3 2821  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2822   W N031/06 W085/X5 0 3201 00117 00196
3 2822  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2823   W N031/06 W085/45 0 3201 X0117 00196
3 2823  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2824   W N031/06 W085/45 0 3201 00117 X0196
3 2824  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 0000   W N031/06 W085/45 0 3201 00117 00196
3 2825  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2826   W W031/06 W085/45 0 3201 00117 00196
3 2826  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2827   W N031/06 N085/45 0 3201 00117 00196
3 2827  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2828   W N-31/06 W085/45 0 3201 00117 00196
3 2828  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2829   W N091/06 W085/45 0 3201 00117 00196
3 2829  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2830   W N031/-6 W085/45 0 3201 00117 00196
3 2830  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2831   W N031/60 W085/45 0 3201 00117 00196
3 2831  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2832   W N031/06 W-85/45 0 3201 00117 00196
3 2832  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2833   W N031/06 W181/45 0 3201 00117 00196
3 2833  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2834   W N031/06 W035/-5 0 3201 00117 00196
3 2834  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2835   W N031/06 W035/60 0 3201 00117 00196
3 2835  9005                                        0360
C TEST              01 0123 0321                   12          038020 038021 0 234
2 2836   W N031/06 W085/45 0 3201 02984 00196
```

TABLE A-3 (cont.)

```
3 2836  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2836   W N031/06 W085/45 0 3201    -5 00196
3 2836  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2837   W N031/06 W085/45 0 3201 00117 03550
3 2837  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2837   W N031/06 W085/45 0 3201 00117   -10
3 2837  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2838   W N031/06 W085/45 0 3201 00117 00196
3 X238  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2839   W N031/06 W085/45 0 3201 00117 00196
3 2839  X005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2840   W N031/06 W085/45 0 3201 00117 00196
3 2840  9X05                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2841   W N031/06 W085/45 0 3201 00117 00196
3 2841  9005                                      X360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2842   W N031/06 W085/45 0 3201 00117 00196
3 2842  9005                                      036X
C TEST               01 0123 0321                12         038020 038021 0 234
2 2843   W N031/06 W085/45 0 3201 00117 00196
3 1343  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2844   W N031/06 W085/45 0 3201 00117 00196
3 2844  9000                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2845   W N031/06 W085/45 0 3201 00117 00196
3 2845  9367                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2846   W N031/06 W085/45 0 3201 00117 00196
3 2846  9005                                      0000
C TEST               01 0123 0321                12         038020 038021 0 234
2 2847   W N031/06 W085/45 0 3201 00117 00196
3 2847  9005                                      0367
C UPDATE                                         12
3 2848  9005                                      0360
C UPDATE                                         12
2 2849
3 2849
C TEST               01 0123 0321                12         038020 038021 0 234
2 2850   W N031/06 W085/45 0 3201 00117 00196
C                    02                          12
2 2851
3 2851
C TEST               01 0123 0321                12         038020 038021 0 234
3 2852  9005                                      0360
2 2852   W N031/06 W085/45 0 3201 00117 00196
C                       1234                     12
2 2853
```

LEC-12900
Appendix 9.1

TABLE A-3 (concl.)

```
3 2853
C                            1234                12
2 2854
3 2854
Q TEST               01 0123 0321                12         038020 038021 0 234
2 2855   W N031/06 W085/45 0 3201 00117 00196
3 2855  9005                                      0360
S TEST               01 0123 0321                12         038020 038021 0 234
2 2856   W N031/06 W085/45 0 3201 00117 00196
3 2856  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
C                                                12         039020
2 2857
3 2857
3 2800  9005                                      0360
C                                                12                040021
2 2858
3 2858
C                                                12                       1
2 2859
3 2859
C                                                12                         004
2 2860
3 2860
C                                                12
2 2861   S
3 2861
C                                                12
2 2862     S025/15
3 2862
C                                                12
2 2863             E120/17
3 2863
C                                                12
2 2864                     1
3 2864
C                                                12
2 2865                       1230
3 2865
C                                                12
2 2870                            00111
3 2870
C                                                12
2 2871                                  00192
3 2871
C                                                12
2 2872
3 2872  9360
C                                                12
2 2873
3 2873                                            0005
C UPDATE             09 3210 4016                12         021016 019112 2 204
2 2874   M N025/12 E100/18 1 2130 00111 00194
3 2874  9045                                      9325
C TEST               01 0123 0321                12         038020 038021 0 234
2 2880   W N031/06 W085/45 0 3201 00117 00196
3 2880  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2881   W N031/06 W085/45 0 3201 00117 00196
3 2881  9005                                      0360
C TEST               01 0123 0321                12         038020 038021 0 234
2 2882   W N031/06 W085/45 0 3201 00117 00196
3 2882  9005                                      0360
```

TABLE A-4

Input Card Images for the Area-of-Interest Delete Process Test

```
D 2849                                        12
D 2850                                        12
D 2851                                        12
D 2852                                        12
D 2853                                        12
D 2854                                        12
X 2855                                        12
A 2856                                        12
D X856                                        12
D 2856                                        X2
D 2856
D 2856                                        20
D 0000                                        12
D 2857                                        12
D 2858                                        12
D 2859                                        12
D 2860                                        12
D 2861                                        12
D 2862                                        12
D 2863                                        12
D 2864                                        12
D 2865                                        12
D 2870                                        12
D 2871                                        12
D 2872                                        12
D 2873                                        12
D 2874                                        12
D 9775                                         1
D 9776                                         1
D 9777                                         1
D 9778                                         1
D 9779                                         1
D 9780                                         1
```

TABLE A-5

Area-of-Interest Fields for the GHIT Process Test

USERID	AOIID	PWRSRP	SWRSRP	PSSSEL	SATSEL	ACQSRT	ACQSTP	TEST PREDICTION FROM FIRST GHIT*	TEST PREDICTION FROM SECOND GHIT*
17	1000	029024	029025	0	234	9200	9300	Accept	Reject
17	1001	029024	029025	1	204	9200	9300	Accept	Reject
17	1002	029023	029024	2	200	9200	9300	Accept	Reject
17	1003	029024	029025	2	234	9200	9300	Reject	Reject
17	1004	029023	029024	1	234	9200	9300	Reject	Reject
17	1005	029024	029025	0	034	9200	9300	Reject	Reject
17	1006	029024	029025	0	234	9290	9300	Reject	Reject
17	1007	029024	029025	0	234	9200	9280	Reject	Reject
17	1008	029022	029023	0	234	9200	9300	Reject	Reject
18	1	038028	038029	0	234	9060	9300	Reject	Accept
18	2	038028	038029	1	034	9060	9300	Reject	Accept
18	3	038028	038029	1	030	9060	9300	Reject	Accept
18	4	038028	038029	0	010	9060	9300	Reject	Accept
18	5	038028	038029	0	234	9060	9300	Reject	Accept
18	6	038028	038029	0	234	9060	9300	Reject	Accept
18	7	038028	038029	0	200	9060	9300	Reject	Reject
18	1818	038028	038029	0	234	9060	9300	Reject	Accept

*See Tables A-7 and A-8 for summary contents of GHIT's.

TABLE A-6

Area-of-Interest Fields for the Extract Process Test

USERID	AOIID	PWRSRP	REGQTR	REGQTS	SCENE QAGEOM	TEST PREDICTION
18	1	038028	5	7	4	Reject
18	2	038028	4	5	4	Extract Search Area
18	3	038028	0	5	4	Extract Search Area
18	4	038028	4	4	4	Extract Area-of-Interest
18	5	038028	0	4	4	Extract Area-of-Interest
18	6	038028	0	0	4	Extract Area-of-Interest

TABLE A-7

Summary Contents of First GHIT

652

```
-----------------------------------------------------------------------------------

    GHIT ID: L0XGT7932703   DATE: 793270308   HDT ID: L2MHP7932410
-----------------------------------------------------------------------------------

SCENE-NO  SCENE-ID  WRSDES ACQDAT QAGEOM LATITUDE LONGITUDE SUN-EL SUN-AZ

   1      2172215473 024029  9283     1
                                            N44-27    W086-15     33     148
   2      2172215480 024030  9283     1
                                            N43-02    W086-48     34     147
   3      2172215482 024031  9283     1
                                            N41-37    W087-19     35     146
   4      2172215485 024032  9283     1
                                            N40-12    W087-49     36     145
   5      2172215492 024033  9283     2
                                            N38-46    W088-18     37     144
   6      2172215494 024034  9283     1
                                            N37-21    W088-47     38     143
   7      2172215500 024035  9283     0
                                            N35-55    W089-14     39     141
   8      2172215503 024036  9283     0
                                            N34-30    W089=41     40     140
   9      2172215505 024037  9283     0
                                            N33-04    W090-07     41     139
  10      2172215512 024038  9283     0
                                            N31-38    W090-33     42     138
  11      2172215515 024039  9223     0
                                            N30-12    W090-58     43     137
  12      2172215521 024040  9223     0
                                            N28-46    W091-22     44     135
```

TABLE A-8

Summary Contents of Second GHIT

GHIT ID: L0XGT7934905 DATE: 793491543 HDT ID: L3MHP7934901

SCENE-NO	SCENE-ID	WRSDES	ACQDAT	QAGEOM	LATITUDE	LONGITUDE	SUN-EL	SUN-AZ
1	3036316184	028036	9062	2	N34-30	W095-25	37	135
2	3036316191	028037	9062	3	N33-04	W095-51	38	134
3	3036316193	028038	9062	4	N31-38	W096-17	39	133
4	3036316200	028039	9062	4	N30-12	W096-42	40	132
5	3036316202	028040	9062	4	N28-46	W097-06	40	131
6	3036316205	028041	9062	2	N27-21	W097-30	41	129
7	3036316211	028042	9062	0	N25-54	W097-53	42	128
8	3038716512	034032	9086	0	N40-12	W102-10	43	135
9	3038716514	034033	9086	1	N38-46	W102-39	44	134

JSC-14635

CHANGE SHEET
FOR THE
ACCEPTANCE TEST SPECIFICATION
FOR
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES)

CHANGE 4

January 15, 1980

Approved By

LEMSCO	NASA
J. I. Morrow, Supervisor Software Section	J. M. Sulester, Technical Monitor Systems and Facilities Branch

---

After the attached pages have been inserted, insert this change sheet between the cover and page 1 and write on the cover "Change 4 inserted".

1. Insert Appendix 9.2 in its entirety.

Signature of person incorporating change

Date

JSC-14635

APPENDIX NUMBER 9.2

ACCEPTANCE TEST SPECIFICATIONS
OF THE
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES) GHIT PROCESSOR

TRANSMITTAL 79-0030
LIVES MODIFICATIONS

Prepared by
J. M. Everette

Approved By

LEMSCO	NASA
J I Morrow 1-10-80	J M Sulester 1/14/80
J. I. Morrow, Supervisor Software Section	J. M. Sulester, Technical Monitor Systems and Facilities Branch

Prepared by
Lockheed Engineering and Management Services Company, Inc.
For
Earth Observations Division

Space and Life Sciences Directorate

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

January 1980

LEC-12900
APPENDIX 9.2
CHANGE 4

CONTENTS

ACCEPTANCE TEST SPECIFICATIONS
OF THE
LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES) GHIT PROCESSOR

APPENDIX NUMBER 9.2

Section — Page

1. SCOPE. 1-1
2. APPLICABLE DOCUMENTS 2-1
3. QUALITY ASSURANCE. 3-1
   - 3.1 <u>GENERAL</u> 3-1
   - 3.2 <u>ACCEPTANCE CRITERIA</u> 3-1
4. TEST 4-1
   - 4.1 <u>GENERAL</u> 4-1
   - 4.2 <u>TEST DATA</u> 4-2
   - 4.3 <u>TEST SCRIPT</u> 4-2
   - 4.4 <u>TEST VERIFICATION</u> 4-2

ATTACHMENT 1 . . . . A-1

1. SCOPE

This document outlines the testing necessary to demonstrate the satisfactory completion of the requirements of Transmittal 79-0030, which called for modifications to the Landsat Imagery Verification and Extraction System (LIVES) GHIT Processor. These modifications are to provide for generation of a single daily PC&S data base when processing multiple GHIT tapes.

2. APPLICABLE DOCUMENTS

The following documents are available to provide more detailed information on the LIVES than is presented in these test specifications:

1. User's Manual, JSC-14632, LEC-12902, March 1979.
2. Operation's Manual, JSC-14633, LEC-12903, August 1979.
3. "As-Built" Design Specification, JSC-14634, LEC-12904, August 1979.
4. Transmittal 79-0030.

3. QUALITY ASSURANCE

3.1 GENERAL

The Quality Assurance Test Witness will ensure that all procedures have been executed, that all output products are correct or within tolerances, and that all modules function as they should. After completion, the Test Preparation Sheet will be completed and signed by persons responsible for each function listed thereon to show approval within his function.

3.2 ACCEPTANCE CRITERIA

Where applicable, a test will be deemed successful if the output generated by the test is identical to the expected output. Response times and other subjective measurements will be deemed successful or unsuccessful by the Test Conductor. If failures or discrepancies occur, they will be noted. In case of problems, a particular test may be suspended at the discretion of the Test Conductor. After problems are resolved, that specific test will recommence at the location specified by the Test Conductor.

4. TEST

4.1 GENERAL

The modifications for this release of the GHIT processor provides for the following:

1) Processing of multiple GHIT tapes to build 1 Daily PC&S data base.
2) Processing of a multiple GHIT tapes during a day with each building a Daily PC&S data base (Note: this is the same capability as provided by the original GHIT processor).
3) Changing of algorithm for identifying scenes. Record ID for the Scene Description Record is now composed of scene number and data of GHIT processing instead of scene number and acquisition date.
4) Adding Scenes Description Records from all scenes to the daily PC&S data base.

The GHIT processor will be tested by (1) Test 1- processing 2 GHIT tapes with the prior version of the GHIT processor, (2) Test 2- processing the same 2 GHIT tapes each with the new GHIT processor building seperate Daily PC&S data bases, (3) Test 3- processing both GHIT tapes together with the new GHIT processor to generate a single Daily PC&S data base. Each test will provide data base printouts for verification.

4.2 TEST DATA

Two GHIT tapes and a Lives Master Data Base containing at least one area of interest to be extracted for each GHIT tape.

4.3 TEST SCRIPT

Attachment 1 contains a step by step test script.

4.4 TEST VERIFICATION

Verification will be accomplished by comparing the data base dumps from Test 1 and the data base dumps from test 2. Then the dumps from Test 3 shall be compared with those from test two.

Test 1 and Test 2 should provide the same type 3 records. Test 2 shall produce more type 2 records; a record will be produced for all scenes in test 2. The field labeled IMGID will differ in the typed 2 record. It shall contain the first 12 characteristics of the GHIT tape name.

Test 3 shall produce identical results to test 2 except all records will be in the same data base.

ATTACHMENTS

ATTACHMENT 1

1.0 TEST SCRIPT

Instructions on running the tests are presented here.

1.1 TEST 1

1) Operator logs on to [5,5] on the Support Processor.

2) Operator readies the magnetic tape labelled "TEST A GHIT" (without a write ring) on MT0 and enters:

   ```
   MCR>MOU MT0:/CHA=[FOR]
   ```

3) Operator readies the RP04 disk labelled "LIVES on DB1 (switch set for Support port) and enters:

   ```
   MCR>MOU DB1:LIVES
   ```

4) Operator does whatever is necessary to ensure that there are no user programs running in the computer and enters:

   ```
   MCR>SET/SLV=TT1:TT2:TT3:TT4:TT5:
   ```

5) Operator copies old version of GHIT by:

   ```
   MCR>PIP @[333,33]OLDTSK
   ```

6) Operator runs the GHIT Processor batch run by entering:

   ```
   MCR>BAT [333,33]GHIT$
   ```

   This batch process runs under the name LIVES1. The operator will make appropriate responses where called for from the batch run, entering <u>CON</u> to the batch run when the requested action has been completed and an "OPERATOR ACTION REQUIRED" message is outstanding.

7) After the LIVES1 batch run has terminated and printed on the line printer, physically dismount the GHIT.

8) Operator readies the next magnetic tape labelled "TEST B GHIT" (without ring) on MT0.

9) Operator runs the GHIT Processor batch run by entering:

   ```
   MCR>BAT [333,33]GHIT$
   ```

This batch process runs under the name LIVES1. The operator will make appropriate responses where called for from the batch run, entering CON to the batch run when the requested action has been completed and an "OPERATOR ACTION REQUIRED" message is outstanding.

10) After the LIVES1 batch run has terminated and printed on the line printer, the GHIT is dismounted by entering:

```
MCR>DMO MT0:
```

and physically removing the tape from the drive.

1.2 TEST 2

1) Operator copies new task by:

```
MCR>PIP @[333,33]UPDATE33

MCR>PIP  [333,33]GHIT.DT0 = [333,17]GHIT.DT0/FO
```

2) Operator readies the magnetic tapes labelled "TEST A GHIT" (without a write ring) on MT0 and TEST B GHIT on MT1 then enters:

```
MCR>MOU MT0:/CHA=[FOR]
MCR>MOU MT1:/CHA=[FOR]
```

3) Operator runs the GHIT Processor batch run by entering:

```
MCR>BAT [333,33]GHIT$
```

This batch process runs under the name LIVES1. The operator will make the the following responses when asked for tape drive information:

1) First a 0 will be entered.
2) Then a 2 will be entered.

4) Operator runs the GHIT Processor batch run by entering:

```
MCR>BAT [333,33]GHIT$
```

1) First a 1 will be entered.
2) Then a 2 will be entered.

1.3 TEST 3

1) Operator runs the GHIT Processor batch run be entering:

```
MCR>BAT [333,33]GHIT$
```

This batch process runs under the name LIVES1. The operator will make the following responses where called for from the batch run,

a) First enter a 0
b) Next enter a 1
c) Then enter a 2

2) After the LIVES1 batch run has terminated and printed on the line printer, the GHIT is dismounted by entering:

```
MCR>DMO MT0:  and removing the tape from the drive.
MCR>DMO MT1:  and removing the tape from the drive.
```

3) Operator dismounts the "LIVES" DISK

```
MCR>DMO DB1:
```

4) Operator sign off

```
MCR>BYE
```

JAN 22 1980

CR 160546

LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM
(LIVES)
TEST SPECIFICATION DISTRIBUTION LIST

R. D. Bratton	NASA/SF6	(1)
D. H. Hay	NASA/SF6	(1)
J. C. Lyon	NASA/SF6	(1)
R. G. Musgrove	NASA/SF6	(1)
J. M. Sulester	NASA/SF6	(1)
A. J. Bowen	LEMSCO/C09	(1)
W. A. Crawford	LEMSCO/C09	(2)
J. M. Everette	LEMSCO/C42	(1)
C. H. Jeffress	LEMSCO/C09	(1)
D. R. Marquis	LEMSCO/C09	(1)
D. K. McCarley	LEMSCO/C42	(1)
W. E. Trump	LEMSCO/C09	(2)
FCMO	FORD/SF6	(1)
Tech Library	LEMSCO	(2)
Job Order File	LEMSCO	(2)